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IN THE

Supreme Court of the United States

RICHARD E. GLOSSIP, ET AL.,

Petitioners,

v.

KEVIN J. GROSS, ET AL.,

Respondents.

On Writ of Certiorari to the United States Court of Appeals for the Tenth Circuit

BRIEF OF THE INNOCENCE PROJECT AS *AMICUS CURIAE* IN SUPPORT OF PETITIONERS

BARRY C. SCHECK
DAVID LOFTIS
M. CHRIS FABRICANT
INNOCENCE PROJECT, INC.
40 Worth Street, Suite 701
New York, NY 10013
(212) 364-5340

JAMES C. DUGAN *
ZHEYAO LI
SHAIMAA HUSSEIN
ERICH ALMONTE
WILLKIE FARR & GALLAGHER LLP
787 Seventh Avenue
New York, NY 10019
(212) 728-8000
jdugan@willkie.com

Counsel for Amicus Curiae The Innocence Project

Counsel of Record

March 16, 2015

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INTEREST OF *AMICUS CURIAE*[1]

The Innocence Project is an organization dedicated to providing pro bono legal and related investigative services to prisoners for whom evidence discovered post-conviction can provide proof of innocence. The Innocence Project is dedicated to improving the accuracy and reliability of the criminal justice system in future cases. Drawing on the lessons from cases in which innocent persons were convicted, the Innocence Project promotes study and reform designed to enhance the truth-seeking function of the criminal justice system, including to ensure that future wrongful convictions are prevented.

The Innocence Project pioneered the DNA model that has exonerated over 300 innocent and wrongfully convicted persons, and has served as counsel in many of these cases. Today, DNA test

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[1] The parties have consented to the filing of this brief. Petitioners and Respondents have filed with the Clerk of the Court letters granting blanket consent to the filing of *amicus curiae* briefs.

Pursuant to Supreme Court Rule 37.6, counsel for *amicus* certifies that no counsel for a party authored this brief in whole or in part, and no party or its counsel made a monetary contribution intended to fund the preparation or submission of this brief. No person other than *amicus*, its members, or its counsel made a monetary contribution to this brief's preparation or submission.

results are widely understood by the public and accepted as evidence at trial, in large part because DNA testing was developed through rigorous scientific research at leading institutions. But not all purportedly scientific evidence admitted at trial has undergone sufficiently rigorous scientific evaluation, including of the underlying data and methodology utilized by expert witnesses. Indeed, in nearly half of the over 300 exonerations secured through post-conviction DNA evidence, the admission of unreliable expert "scientific" evidence—such as hair analysis, fingerprint analysis, and more—has played a role in convicting the innocent.

Moreover, the impact of wrongly admitted, unreliable scientific evidence is not limited to the conviction of the innocent. Executions in the United States rely on various ever-changing combinations of drugs, despite a lack of scientific evidence supporting their effectiveness. The Innocence Project has a strong interest in ensuring that scientific expert testimony is accurate and reliable throughout the criminal justice system. This interest is implicated by the trial court's impermissible dependence on unreliable scientific evidence proffered by Respondents' sole expert witness to sustain the constitutionality of a three-drug lethal injection protocol, where well-established scientific consensus holds that the first drug has no pain-relieving properties and cannot reliably produce deep, coma-like unconsciousness, and it is undisputed that there

is a constitutionally unacceptable risk of pain and suffering from administration of the second and third drugs to a conscious prisoner.

INTRODUCTION AND SUMMARY OF ARGUMENT

This Court has long recognized the importance of scientific evidence in our judicial system and the need for that evidence to be "reliable." *Daubert v. Merrell Dow Pharm., Inc.*, 509 U.S. 579, 590 (1993). Scientific experts are permitted to testify as to their opinions regarding the conclusions to be drawn from a particular set of facts if those conclusions can be given to a reasonable degree of scientific certainty. *Daubert* made clear that courts have not only the power but also the obligation to fulfill this "gatekeeper" function. *Id.* at 589. In so doing, it also articulated standards for assessing the reliability of scientific evidence. These standards are intended to ensure that only evidence grounded in the scientific method—that is, scientifically valid principles of testing and validation—is admitted as expert evidence. These principles include empirical testing methods, peer review, and the existence of objective standards controlling the technique's operation. *Daubert*, 509 U.S. at 593-94; *see also* FED. R. EVID. 702(c) (expert testimony must be "the product of reliable principles and methods"). These principles are "meant to be helpful, not definitive," with the overarching inquiry being "the scientific validity—

and thus the evidentiary relevance and reliability—of the principles that underlie a proposed submission." *United States v. Johnsted*, 30 F. Supp. 3d 814, 817 (W.D. Wis. 2013); *Daubert*, 509 U.S. at 590 n.9 ("In a case involving scientific evidence, evidentiary reliability will be based upon scientific validity.").

Distinguishing between reliable and false scientific evidence is especially critical, given the special weight afforded to scientific evidence. Indeed, this Court has acknowledged the special deference that factfinders grant to scientific evidence offered by expert witnesses. *See, e.g.*, *Daubert*, 509 U.S. at 595 ("Expert evidence can be both powerful and quite misleading because of the difficulty in evaluating it."); *see also Ake v. Oklahoma*, 470 U.S. 68, 81 n.7 (1985) ("[T]estimony emanating from the depth and scope of specialized knowledge is very impressive to a jury. The same testimony from another source can have less effect.") (internal citation omitted). Similarly, a survey of judges and lawyers found that 75% of them believe judges accord greater credibility to scientific evidence.[2] Given these statistics, "[t]he importance of *Daubert*'s gatekeeping requirement cannot be overstated."

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[2] Paul C. Giannelli, *Scientific Evidence in Criminal Prosecutions*, 137 MIL. L. REV. 167, 173 (1992).

United States v. Frazier, 387 F.3d 1244, 1260 (11th Cir. 2004) (en banc).[3]

Reliance on scientific evidence played a central role in the decisions by the lower courts in this case as well. Petitioners face execution by lethal injection through a three-drug protocol consisting of 500 milligrams of midazolam, 100 milligrams of a paralytic,[4] and 240 milliequivalents of potassium chloride. The stated purpose of the first drug, midazolam, is to render the prisoner unconscious and insensate to pain. Petitioners' experts, however, presented well-referenced scientific evidence showing that midazolam has no analgesic effect, has a ceiling effect (that is, larger doses do not increase its effect), and at times causes a paradoxical reaction, creating agitation instead of sedation. They also presented

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[3] Indeed, this Court has recently acknowledged the threat that unvalidated and unreliable "scientific" evidence has on the fair administration of justice. *Hinton v. Alabama*, 134 S. Ct. 1081, 1090 (2014) ("[W]e have recognized the threat to fair criminal trials posed by the potential for incompetent or fraudulent prosecution forensics experts, noting that '[s]erious deficiencies have been found in the forensic evidence used in criminal trials... One study of cases in which exonerating evidence resulted in the overturning of criminal convictions concluded that invalid forensic testimony contributed to the convictions in 60% of the cases.'") (citing *Melendez-Diaz v. Massachusetts*, 557 U.S. 305, 319 (2009)).

[4] Paralytics include pancuronium bromide, vecuronium bromide, and rocuronium bromide.

scientific evidence showing that midazolam is not effective in keeping a person sedated when faced with noxious stimuli.[5] This Court has already held that pancuronium bromide and potassium chloride, administered to a prisoner who is not unconscious, would cause a "substantial, constitutionally unacceptable risk of suffocation ... and pain." *Baze v. Rees*, 553 U.S. 35, 53 (2008). Because of its inherent characteristics, Petitioners argue that midazolam cannot perform its role in the execution protocol, namely, keeping the prisoner unconscious and insensate to pain while the lethal drugs are administered.

The three-drug protocol including midazolam was used for the first time by the State of Oklahoma on April 29, 2014, in its execution of Clayton Lockett. After receiving all three drugs (including 100 milligrams of midazolam) and being declared unconscious, Mr. Lockett began to speak and move. The State then concealed Mr. Lockett from public view; he died thereafter. The State conducted an investigation into Mr. Lockett's execution, eventually concluding that an improper intravenous line had been the cause of the problem. Following that

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[5] Noxious stimuli are events that are "disconcerting to the brain. That can be everything from air hunger from rising carbon dioxide levels after vecuronium is given to the pain of the potassium chloride injection." J.A. vol. I 218 [hereinafter J.A.].

finding, the State adopted a new execution protocol, which includes the same three-drug combination used in the Lockett execution. The new protocol merely increases the dosage of midazolam from 100 milligrams to 500 milligrams. This minor change, however, is inadequate because researchers and medical practitioners have concluded that midazolam has no analgesic, or pain-relieving, qualities. As noted, moreover, midazolam has a ceiling effect—a dose beyond which any additional dosage does not produce any additional effect.[6]

Petitioners were among a group of twenty-one Oklahoma death-row inmates to file a 42 U.S.C. § 1983 complaint challenging the state's use of midazolam in executions. Petitioners sought a preliminary injunction to stay their executions until the district court could rule on the merits of their claims. After a three-day hearing, the district court denied their request, concluding that they had failed to demonstrate a likelihood of success on the merits of their claims. The Tenth Circuit affirmed. After denying Petitioners' application for stays of execution, this Court granted *certiorari*.

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[6] Medical literature describes midazolam as reaching "its maximal effect on brain activity after a dose of approximately 0.3 mg/kg." J.A. 233. For a 70-kilogram (or 154-pound) adult, then, the ceiling effect would occur at 21 milligrams.

In evaluating whether to grant a preliminary injunction, the district court heard testimony from Petitioners' experts about midazolam's characteristics and its ceiling effect, as well as its potential for causing agitation and combativeness. To rebut Petitioners' evidence regarding midazolam, Respondents presented only one expert: Dr. R. Lee Evans, who has not published a clinical study of drug effects in almost two decades. Dr. Evans testified that 500 milligrams of midazolam is sufficient to render any individual unconscious at a level sufficient to resist the noxious stimuli that may occur from the administration of the subsequent lethal drugs. Dr. Evans's conclusion was not supported by any reliable scientific data, and it lacked a basis in scientific principles or methodology; its deficiencies, moreover, were compounded by a key mathematical error. Dr. Evans read a "toxic" dose of midazolam to be 0.071 mg/kg, but his source actually shows a number of 71 mg/kg. J.A. 329. For a 70-kilogram (or 154-pound) adult, then, a "toxic" dose would be 4,970 milligrams, almost ten times the 500-milligram dose called for in Respondents' lethal injection protocol.

Dr. Evans even admitted that his conclusion about midazolam was not based on any scientific studies administering that dosage of the drug but, rather, was an extrapolation based on what he understood about fatalities allegedly caused by overdoses of midazolam. Dr. Evans also ignored critical evidence undermining his conclusion. As

defined by the scientific principles more fully described below, Dr. Evans's testimony was not scientifically rigorous, nor did he rely upon any scientific literature in formulating his opinions. For these reasons, Dr. Evans's improper scientific testimony failed *Daubert*, and the district court clearly erred in relying upon it to deny the motion for preliminary injunction.

ARGUMENT

I. SCIENTIFIC EVIDENCE MUST ADHERE TO SCIENTIFIC PRINCIPLES OF TESTING AND VALIDATION TO BE ADMISSIBLE.

In *Daubert*, this Court charged trial judges with ensuring "that any and all scientific testimony or evidence admitted is not only relevant, but reliable." *Daubert*, 509 U.S. at 589. To be admissible in court as "scientific knowledge," testimony must meet "a standard of evidentiary reliability." *Daubert*, 509 U.S. at 590. The Federal Rules of Evidence require not only that an expert witness be qualified by "knowledge, skill, experience, training or education" but also that the expert's testimony be "based upon sufficient facts or data" and "the product of reliable principles and methods." FED. R. EVID. 702. "[A] district judge asked to admit scientific evidence must determine whether the evidence is genuinely scientific, as distinct from being unscientific speculation offered by a genuine

scientist." *Rosen v. Ciba-Geigy Corp.*, 78 F.3d 316, 318 (7th Cir. 1996) (Posner, J.) (citing *Daubert*). This Court explained that the "focus, of course, must be solely on principles and methodology, not on the conclusions that they generate." *Daubert*, 509 U.S. at 595. "Such an approach is nothing more [and nothing less] than an effort to ensure that expert testimony does not enjoy the persuasive appeal of science without subjecting its propositions to the verification processes of science."[7]

More specifically, to meet the Court's standard of reliability, scientific evidence must "be derived by the scientific method" and "be supported by appropriate validation—*i.e.*, 'good grounds,' based on what is known." *Id.* at 590.[8] "[I]n order to qualify as 'scientific knowledge,' an inference or assertion must be derived by the scientific method." *Daubert*, 509 U.S. at 590. "The scientific method presumes that events occur in consistent patterns that can be

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[7] John William Strong, *Language and Logic in Expert Testimony: Limiting Expert Testimony by Restrictions of Function, Reliability, and Form*, 71 OR. L. REV. 349, 368 (1992).

[8] The *Daubert* standard is not intended to "banish novel applications of science from the courtroom, but it does demand that trial judges assure themselves that the underlying science is sound, so that the scientific expert is presenting scientific knowledge rather than speculating or dressing up unscientific opinion in the garb of scientific fact." FEDERAL JUDICIAL CENTER, REFERENCE GUIDE ON MEDICAL TESTIMONY 553 (2d ed. 2000).

understood through careful comparison and systematic study."[9] It is the "use of validated methods and care in following their protocols; the development of careful and adequate documentation; the avoidance of biases; and interpretation conducted within the constraints of what science will allow" that are the hallmarks of basic science.[10] Using these principles, theories are formulated to explain any number of events or occurrences. To gain credibility, these theories are then investigated repeatedly, shared through conferences and publications, and scrutinized by peers.[11]

One important consideration in this regard is whether the scientific knowledge "can be (and has been) tested" and whether it "has been subjected to peer review and publication." *Daubert*, 509 U.S. at

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[9] NATIONAL RESEARCH COUNCIL OF THE NATIONAL ACADEMIES, STRENGTHENING FORENSIC SCIENCE IN THE UNITED STATES: A PATH FORWARD 112 (2009).

[10] NATIONAL RESEARCH COUNCIL, at 113.

[11] NATIONAL RESEARCH COUNCIL, at 112-13. Scientific method, by its very nature, requires continuous testing and validation. "Scientists continually observe, test, and modify the body of knowledge. Rather than claiming absolute truth, science approaches truth either through breakthrough discoveries or incrementally, by testing theories repeatedly." *Id.* "Typically, experiments or observations must be conducted over a broad range of conditions before the roles of specific factors, patterns, or variables can be understood." *Id.*

593. Scientific literature is comprised of journals and other peer-reviewed materials intended to report empirical data and theories derived through the scientific method.[12] Inclusion in scientific literature involves a rigorous vetting process intended to inspire confidence in the content of such material.[13]

The *Daubert* analysis provides a method by which to assess all purportedly scientific evidence for reliability. Previously, courts employed divergent standards with predictably differing results, even for the same type of evidence. The danger of this undisciplined approach is evident in one particular example—the use of microscopic hair analysis, which *amicus* has studied diligently.[14] *Compare United*

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[12] National Commission on Forensic Science, *Views on Scientific Literature in Support of Forensic Science and Practice*, at 2 (adopted Jan. 30, 2015).

[13] For example, "[t]hroughout scientific investigations, the investigator must be as free from bias as possible, and practices are put in place to detect biases ... and to minimize their effects on conclusions." NATIONAL RESEARCH COUNCIL, at 112. For this reason, "[m]ethods that are specified in more detail ... will have greater credibility ... than those that rely more heavily on the judgments of the investigator." *Id.* at 114.

[14] "Before DNA testing was used in criminal trials, prosecutors throughout the country routinely relied on microscopic hair comparison analysis, often provided by the FBI, to link a criminal defendant to a crime." Innocence Project, *Innocence Project and NACDL Announce Historic Partnership with the FBI and Department of Justice on Microscopic Hair Analysis Cases* (July 18, 2013), available at http://www.innocence

States v. Cyphers, 553 F.2d 1064, 1071-73 (7th Cir. 1977) (allowing testimony that hairs recovered from crime scene were "microscopically like" hair samples taken from defendants because admissibility did not require "reasonable scientific certainty"), *with State v. Carlson*, 267 N.W.2d 170, 176 (Minn. 1978) (similar testimony was "improperly received" due to "the substantial unfairness to a defendant which may result from ill conceived techniques with which the trier of fact is not technically equipped to cope") (internal citation and quotation omitted).

Since *Cyphers* and *Carlson*, post-*Daubert* federal courts have become more sensitive to the dangers of unreliable expert opinions. As a result, courts have found that microscopic hair analysis lacks sufficient indicia of scientific reliability.[15] An important example is *Williamson v. Reynolds*, where the petitioner sought a writ of habeas corpus after being wrongfully convicted of capital murder and sentenced to death. 904 F. Supp. 1529 (E.D. Okla. 1995), *aff'd sub nom. Williamson v. Ward*, 110 F.3d

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project.org/news-events-exonerations/press-releases/innocence-project-and-nacdl-announce-historic-partnership-with-the-fbi-and-department-of-justice-on-microscopic-hair-analysis-cases.

[15] In 2009, the National Academy of Science also deemed the practice to be "highly unreliable." NATIONAL RESEARCH COUNCIL, at 161.

1508 (10th Cir. 1997).[16] Among the petitioner's claims was a challenge to evidence submitted by the government regarding a microscopic hair comparison conducted by criminologist Melvin Hett. At trial, Hett testified that he used a comparison microscope with magnifying capabilities of 50 to 400 times to compare samples of hair from the petitioner with hair found at the crime scene. Hett concluded that the samples "matched" based on a number of characteristics he observed. *Williamson v. Reynolds*, 904 F. Supp. at 1553-54.

On habeas review, the district court expounded upon the need for expert testimony to be based on scientific reliability, as opposed to subjective speculation. The court held that the hair-matching evidence was speculative because "[a]lthough the hair expert may have followed procedures accepted in the community of hair experts, the human hair comparison results were, nonetheless, *scientifically* unreliable." *Id.* at 1558 (emphasis added). Specifically, the court explained

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[16] While affirming the district court's granting of a new trial, the Tenth Circuit instructed that in a federal habeas challenge to a state court proceeding, review of the admission of evidence should be "under a due process/fundamental fairness standard." *Williamson v. Ward*, 110 F.3d at 1523. Nevertheless, that assessment also requires examining "the reliability of the evidence," *id.*, and the district court's analysis remains an excellent example of the reliability analysis mandated by *Daubert* before scientific evidence can be admitted.

that such testimony could not properly be introduced as scientific evidence because "there is no research to indicate with any certainty the probabilities that two hair samples are from the same individual" and "the weight the examiner gives to the presence or absence of a particular characteristic depends upon the examiner's subjective opinion" as opposed to objective standards. *Id.* at 1556-58.

Following the federal court's grant of habeas relief, DNA testing excluded Williamson as a suspect, another person was convicted of the crime, and Williamson's story of "wrongful conviction, imprisonment, and subsequent exoneration" were chronicled by author John Grisham in his 2006 book *The Innocent Man*. *Peterson v. Grisham*, 594 F.3d 723, 726 (10th Cir. 2010). Indeed, the failure of various courts to perform adequate gatekeeping in relation to hair comparison evidence has led to an unprecedented audit of thousands of hair comparison cases in a collaborative effort among the Innocence Project, the National Association for Criminal Defense Lawyers ("NACDL"), the FBI, and the Department of Justice.[17]

Unfortunately, notwithstanding the advances in science and guidance provided by this Court in *Daubert*, confusion abounds in the lower courts as to what actually constitutes reliable scientific evidence.

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[17] *See* Innocence Project, *supra* note 14.

Fortunately, the lower courts often get it right when they ask whether expert opinions have been derived through the scientific method and are supported by peer-reviewed literature. For example, in *Moore v. Ashland Chemical, Inc.*, the Fifth Circuit, sitting en banc, affirmed the exclusion of an expert's opinion on the cause of the plaintiff's illness, where that opinion was not well-grounded in the scientific method. 151 F.3d 269 (5th Cir. 1998) (en banc), *cert. denied*, 119 S. Ct. 1454 (1999). In *Moore*, the plaintiff claimed that a leak of Toluene solution in his truck caused him to develop reactive airways dysfunction syndrome ("RADS"), an asthmatic-type condition. The trial court rightfully refused to permit one of the plaintiff's medical witnesses, Dr. Daniel E. Jenkins, a pulmonary specialist, to give an opinion on the cause of the plaintiff's illness. *Id.* at 273. Although Dr. Jenkins was permitted to testify about the facts of his personal examination of the plaintiff, the court excluded his conclusion that the Toluene solution caused the plaintiff's RADS. *Id.* at 273-74.

As the court explained, under *Daubert*, Dr. Jenkins's opinion regarding the cause of the plaintiff's illness was not sufficiently reliable for a number of reasons. *Id.* at 277-79. First, he lacked experience actually treating patients who were exposed to Toluene solution. Nor did Dr. Jenkins rely on any medical literature purporting to establish a link between exposure to Toluene solution and the development of RADS. Additionally, Dr. Jenkins's

theory of causation was not supported by scientific principles: "Dr. Jenkins's theory had not been tested; the theory had not been subjected to peer review or publication; the potential rate of error had not been determined or applied; and the theory had not been generally accepted in the scientific community." *Id.* at 279. Consequently, the court found his opinion regarding causation to be "unscientific speculation offered by a genuine scientist" as opposed to "genuinely scientific" evidence. *Id.* at 278 (internal citation omitted).

As these and many other cases make clear, information or testimony offered as scientific evidence may be unreliable for a multitude of reasons. *See, e.g.*, *Henry v. St. Croix Alumina, LLC*, 572 F. App'x 114, 118 (3d Cir. 2014) (experts' opinions as to amount and toxicity of irritant escaping plant were not reliable because they "did not utilize a peer-reviewed methodology, subject to any known rate of error"); *Polski v. Quigley Corp.*, 538 F.3d 836, 840 (8th Cir. 2008) (district court properly excluded expert's testimony because his theory had not been tested at all); *Ruggiero v. Warner-Lambert Co.*, 424 F.3d 249, 254 (2d Cir. 2005) (expert's testimony about diagnosis was unreliable because it was not based on any studies and failed to rule out other possible causes); *Marsh v. W.R. Grace & Co.*, 80 F. App'x 883, 887 (4th Cir. 2003) (expert's testimony was unreliable because the theories underlying his conclusion had not been

subjected to peer review or publication, and failed to provide a means to verify his conclusion by ruling out alternative causes); *Alison v. McGhan Medical Corp.*, 184 F.3d 1300, 1313 (8th Cir. 1999) (expert's testimony was unreliable because it did not use proper scientific methodology, his theories had not been tested or subjected to peer review, and were not generally accepted by the scientific community); *Bradley v. Brown*, 42 F.3d 434, 438 (7th Cir. 1994) (testimony of experts unreliable where "the method leading to their conclusions was merely anecdotal").[18]

It is thus imperative that judges fulfill their gatekeeper role by screening scientific evidence to ensure that it is grounded in scientifically valid principles and methodology. Empirical testing, peer review and publication, the existence of known or potential error rates, and standards controlling the technique's operation are just some of the hallmarks

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[18] Comparative bullet-lead analysis, "a forensic test once thought capable of identifying unique bullets based on their chemical makeup," presents another relevant example of previously used scientific evidence that has, after investigation by the National Academy of Sciences, been found to be unreliable. In 2005, the FBI ceased offering such evidence, and as of January 2010, at least three convictions where bullet lead evidence was used had been overturned. Innocence Project, *Three Freed, and FBI Continues to Review Ballistic Cases* (Jan. 19, 2010), available at http://www.innocenceproject.org/news-events-exonerations/three-freed-and-fbi-continues-to-review-ballistic-cases.

of basic scientific method.[19] Adherence to these standards is critical in differentiating between reliable and unreliable scientific evidence.

II. THE DISTRICT COURT ABUSED ITS DISCRETION BY ADMITTING PATENTLY UNRELIABLE SCIENTIFIC TESTIMONY.

Given the importance of scientific testimony in our justice system, the courts' vital gatekeeping role under *Daubert* is "to ensure the reliability and relevancy" of that testimony. *Kumho Tire Co., Ltd. v. Carmichael*, 526 U.S. 137, 152 (1999). It is the court's responsibility to "make certain that an expert ... employs in the courtroom the same level of intellectual rigor that characterizes the practice of an expert in the relevant field." *Id.*; *see also Gen. Elec. Co. v. Joiner*, 522 U.S. 136, 148 (1997) ("[W]hen law and science intersect, [the courts' gatekeeper] duties often must be exercised with special care.") (Breyer, J., concurring); *Jinro America Inc. v. Secure Investments, Inc.*, 266 F.3d 993, 1005 (9th Cir. 2001) ("[A]lthough the district judge has discretionary authority, reviewable for its abuse, to determine reliability in light of the particular facts and circumstances of the particular case, the *proper* exercise of that gatekeeping function is critically

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[19] FEDERAL JUDICIAL CENTER, at 12 (citing *Daubert*, 509 U.S. at 593-94).

important.") (emphasis added and internal quotations omitted) (citing *Kumho Tire*, 526 U.S. at 158, and *Daubert*, 509 U.S. at 590, 594-95).[20]

Under this Court's precedents, "a court of appeals is to apply an abuse-of-discretion standard when it 'review[s] a trial court's decision to admit or exclude expert testimony.'" *Kumho Tire*, 526 U.S. at 152 (citing *Joiner*, 522 U.S. at 138-39).[21] Although

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[20] Studies have suggested that *improper* performance of the courts' *Daubert* gatekeeper function is more rampant in criminal cases than civil cases. *See* David L. Faigman, *et al.*, *Applying* Daubert: *Criminal Cases*, 1 MOD. SCI. EVIDENCE § 1:35 (2014-15 ed.). In civil cases, the rate of exclusion of challenged expert evidence has risen from about 50% pre-*Daubert* to as high as 70% in the years post-*Daubert*. *Id.* But in criminal cases, "in federal district courts, defense challenges to government evidence succeeded less than 10% of the time." *Id.* While some differences between criminal and civil litigation—including the burdens and incentives of the parties—may contribute to that large disparity, commentators have opined that "if *Daubert* gatekeeping were rationally based on the quality of the underlying expert evidence, the exclusion rate pursuant to defense challenges would be higher than it is." *Id.*

[21] Trial courts must determine "whether particular expert testimony is reliable and will assist the trier of fact," as well as "whether the probative value of testimony is substantially outweighed by risks of prejudice, confusion or waste of time." *Joiner*, 522 U.S. at 520 (Breyer, J., concurring) (citing FRE 702 and FRE 403; internal quotations omitted). To the extent these findings require firsthand observation and subjective judgment, deference to the courtroom setting is appropriate. But "[t]he first and most significant *Daubert* factor is whether the

abuse-of-discretion is a relatively high standard, it is not a blank check allowing trial courts to admit unreliable scientific evidence, such as "opinion evidence that is connected to existing data only by the *ipse dixit* of the expert." *Joiner*, 522 U.S. at 146. Put differently, "it is not discretion to perform the function inadequately. Rather, it is discretion to choose among *reasonable* means of excluding expertise that is *fausse* and science that is junky." *Kumho Tire*, 526 U.S. at 159 (Scalia, J., joined by O'Connor and Thomas, JJ., concurring) (emphasis in original). When a trial court fails to require that an expert's "particular opinions [be] based on valid reasoning and reliable methodology" before admitting that expert's testimony, the court abuses its discretion. *Tauto v. Brown*, 85 F. App'x 674, 677 (10th Cir. 2003) (reversing and remanding for a new trial because district court abused its discretion in failing to perform its *Daubert* gatekeeper function properly); *see also Dodge v. Cotter Corp.*, 328 F.3d 1212, 1228-29 (10th Cir. 2003) (reversing when district court abused its discretion by declining to

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scientific theory has been subjected to the scientific method." *Bradley*, 42 F.3d at 438. Such objective factors as whether a scientific foundation was laid and the scientific method followed focus more on scientific truths. Thus, unlike weighing prejudice versus probative value, review of objective, scientific factors can be more reliably accomplished on appeal. Since objective scientific truths are equally available to appellate and trial judges, more robust review is both possible and appropriate.

review "full copies of all relevant studies upon which the experts relied").

Moreover, the trial court's gatekeeper function must focus on an examination of the expert's methodology, not just his qualifications. Even "[a] supremely qualified expert cannot waltz into the courtroom and render opinions unless those opinions are based upon some recognized scientific method and are reliable and relevant under the test set forth by the Supreme Court in *Daubert*." *Clark v. Takata Corp.*, 192 F.3d 750, 759 n.5 (7th Cir. 1999). In examining the putative expert's reasoning and methodology, the trial court must "determine whether it is scientifically valid and applicable to a particular set of facts." *Goebel v. Denver & Rio Grande Western R.R. Co.*, 215 F.3d 1083, 1087 (10th Cir. 2000); *id.* at 1088 ("It is axiomatic that an expert, no matter how good his credentials, is not permitted to speculate."). Scientific validity depends on the factors discussed *supra*, Argument Part I.

In this case, the trial court abused its discretion when it failed to properly exercise its gatekeeper role by relying on expert testimony lacking in scientific validity. The trial court relied solely on the testimony of Respondents' single expert, Dr. Evans, in determining that 500 milligrams of midazolam "would make it a virtual certainty that any individual will be at a sufficient level of unconsciousness to resist the noxious stimuli which

could occur from the application of the second and third drugs." J.A. 77. Dr. Evans's opinion, however, was admittedly based on "extrapolation" and "assumption." Tr. of Prelim. Inj. Hr'g at 667-68, *Warner v. Gross*, No. 5:14-cv-665 (W.D. Okla. Dec. 17-19, 2014) [hereinafter Tr.].[22] He conceded that he was "essentially extrapolating this piece and saying there is a linear effect in terms of administration of the drug." *Id.*

But a key indicator of the reliability of expert testimony is "[w]hether the expert has *unjustifiably extrapolated* from an accepted premise to an unfounded conclusion."[23] In such circumstances a trial court "may conclude that there is simply too great an analytical gap between the data and the opinion proffered." *Joiner*, 522 U.S. at 146. Dr. Evans based his opinion on uncited, unsubstantiated anecdotes involving unknown dosages of midazolam.

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[22] "The burden of establishing qualification, reliability, and helpfulness rests on the proponent of the expert opinion, whether the proponent is the plaintiff or the defendant in a civil suit, or the government or the accused in a criminal case." *United States v. Frazier*, 387 F.3d 1244, 1260 (11th Cir. 2004) (en banc). Given the unsatisfactory reasoning propounded by Dr. Evans as described herein, the lower court's ruling that Respondents had carried their burden of establishing the admissibility of his testimony was incorrect.

[23] Advisory Committee Notes, FED. R. EVID. 702 (2000) (emphasis added).

Tr. 667-68.[24] In contrast, the well-documented executions of Clayton Lockett and Joseph Wood provide objective evidence that is contrary to Dr. Evans's extrapolations. Even large amounts of midazolam demonstrably did not render those two prisoners comatose. J.A. 392-94; J.A. 176-77. In particular, Mr. Wood received a total of 750 milligrams of midazolam, 250 milligrams above what Dr. Evans opined should be more than sufficient to render someone comatose, or even kill him. J.A. 176-77.[25] Dr. Evans's anecdotes of overdoses also failed to address whether midazolam reliably induces a sustained comatose state prior to death, a key issue in this case. Such unjustifiable extrapolation by Dr. Evans reflects exactly the type of "analytical gap" that is a hallmark of scientifically unreliable evidence.

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[24] Without dosage data, it is unclear how Dr. Evans could have established his assumption of a "linear effect," particularly in light of the observed "ceiling effect" of midazolam described in the scientific literature. J.A. 172, 206, 208-09; Tr. 343; Tr. 664. Admitting Dr. Evans's "speculative conclusions about [a drug's] toxicity from questionable principles of pharmacology" constitutes reversible error. *McClain v. Metabolife Intern., Inc.*, 401 F.3d 1233, 1240 (11th Cir. 2005).

[25] As illustrated by these horrifically botched executions, Dr. Evans's opinion also suffers from having "no known potential rate of error." *Vargas v. Lee*, 317 F.3d 498, 501 (5th Cir. 2003). The admission of scientific evidence that "has not been verified or generally accepted, [and] also has no known potential rate of error ... constitute[s] an abuse of discretion." *Id.*

Dr. Evans's opinion testimony also suffers from additional scientific defects. Rather than relying on extensive testing and peer-reviewed sources as the scientific method requires, *see supra*, Argument Part I, Dr. Evans instead consulted drugs.com, a reference website ("really a tertiary resource," J.A. 325) targeted for mass consumption, and a Material Safety Data Sheet ("MSDS") about midazolam. The MSDS is a document required by the Occupational Safety and Health Administration ("OSHA") designed to alert workers about potential dangers of chemicals. 29 C.F.R. § 1910.1200(g). Drugs.com warns users that it "*is not intended for medical advice, diagnosis or treatment.*" J.A. 276. The MSDS warns that the information it provides is "*without any warranty, express or implied, regarding its correctness.*" J.A. 279. As such, neither is a valid source of scientifically reliable information. In addition, Dr. Evans committed a material miscalculation while relying on what the MSDS suggested could be a toxic dose of midazolam: he used a number in his calculations that was off by a factor of one thousand, rendering Respondents' planned 500-milligram dose a mere tenth of what a correctly calculated toxic amount would be under the MSDS. J.A. 329.[26] Where an expert "infers

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[26] Dr. Evans read a "toxic" dose of midazolam to be 0.071 mg/kg, but the MSDS actually conveys a number of 71 mg/kg. J.A. 329. For a 70-kilogram (or 154-pound) adult, then, a "toxic" dose would be 4,970 milligrams, almost ten times the 500-

conclusions from studies and reports that the papers do not authorize, and unjustifiably relies on government public health reports ... to establish medical causation," his opinions "lack the indicia of reliability necessary to survive a *Daubert* inquiry and challenge under Rule 702." *McClain*, 401 F.3d at 1240 (reversing where trial court erroneously admitted expert testimony); *Moore*, 151 F.3d 269 (clinical doctor's opinion testimony properly excluded where it was not sufficiently grounded in scientific methodology). Given these clear errors, the trial court's decision to rely on Respondents' expert testimony was an abuse of discretion.

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milligram dose that Respondents' lethal injection protocol calls for.

CONCLUSION

The judgment of the Tenth Circuit Court of Appeals should be reversed.

Respectfully submitted,

BARRY C. SCHECK
DAVID LOFTIS
M. CHRIS FABRICANT
INNOCENCE PROJECT, INC.
40 Worth Street,
Suite 701
New York, NY 10013
(212) 364-5340

JAMES C. DUGAN *
ZHEYAO LI
SHAIMAA HUSSEIN
ERICH ALMONTE
WILLKIE FARR &
GALLAGHER LLP
787 Seventh Avenue
New York, NY 10019
(212) 728-8000
jdugan@willkie.com

**Counsel of Record*

Counsel for Amicus Curiae The Innocence Project

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